tranquillising and cheering amusements afforded by a boat and sculls; but with a view of experimenting on the quality of the river breeze, which formerly we called "a *fresh*," I took a skiff, and with three or four friends shoved off at Battersea at 7 p.m., determined to reach Kew-bridge and return for a supper at the comfortable bridge-foot inn (Surrey side).

The reach at Battersea was muddy, and the air heavy and dark: every creek before we came in sight proclaimed evidence of new malaria, and, strange though it seem, each contributed a fresh variety of narcotic essence, plainly discernible as the effluvium from corruption of a varied pest—dye stuffs, decayed vegetation, gas, bone, oil, and other countless gradations, till approaching the Bishop's Palace in the broad Fulham reach, all the horrors of Pandora seemed to be amalgamated in one streaming vapour.

The stream rushed as usual under the beams and bulk of Putney-bridge, and here a short reprieve was granted to the senses for about 300 yards, when again a vapour, thick and offensive as the Stygian lake, enveloped us, until, sick and disgusted, we took the shore at Hammersmith, and were glad to walk to Kensington rather than submit to the ordeal of a return by foul water, more foul in the heavier shade of night.

This description may appear overcharged, but it is true; and any one who doubts it, needs but to try the same row at the same hour to be convinced of the real presence of the horrible reek.

It may be considered very useless, or even mischievous, to find fault with matters as they are; and so it would be if there were no mode of amending the evil complained of; but there is a mode. The clear blue waters of the Rhone, those of the St. Lawrence, and other great floods, are the themes of admiration and delight: travellers describe them, and are in raptures; but on the great lakes from which they flow the population is scant: still the former river is muddy enough hundreds of miles before it reaches the Gulf of Lyons.

Along our Thames numerous towns discharge their sullage, and no care has hitherto been taken to conserve the parent stream: the works (Azote) which have been established at Blackfriars (by Mr. Moffatt), show that such conduits of filth may not only be diverted, but turned to profit.

There are not very many creeks and main-sewers, and these being the main cause of pollution, might be turned to account on the now established principle of azote manufactories; whilst the numerous factories, mills, and depositaries of nuisances along the river banks might be obligated to consume their own waste, by applying the deodorizing process, and converting it into a marketable commodity, as the factories of Macclesfield and other towns are forced to consume their own smoke. What the municipal authorities could effect in these communities in that respect might be enforced in London with equal justice with regard to the sewage discharge into the river.

However it is accomplished, the conservancy of the Thames cannot be much longer delayed, for the increasing stercor will, in a few years more, render it wholly intolerable; and, with regard to the water supply for the inhabitants, it is already utterly unfit for that purpose. No process of tank reserves, or expurgation by *subsidence*, can make it a wholesome diluent for food, cooking, or washing.

Statistical returns prove that longevity is increased just in the ratio of the purity of water supply; and the returns of the Sanitary Board sufficiently demonstrate that the fearful scourge of cholera followed the course of Thames pipe-water in a ratio exactly in proportion to that point of the stream (higher or lower) whence the companies derived their sources; Brentford being less fatal than Hammersmith, Hammersmith than Fulham, and that again less than the lower reaches; but the mortality was traceable along the open sewers, and in those neglected districts where there was no vent, and where cesspools abounded, and there the ravages were still more remarkable.

The corporation discuss this subject, the Senate debates on it, and numerous parochial boards amuse themselves in disquisitions on filth and foul aquatics; yet we are none the nearer to pure water supply, and but little advanced in a system of general sewage. Those companies which have been doling in scant measure a disgusting commodity at a high price, are, as it would appear to be, *incorporated in one grand and* IMPOSING *executive*.

The subject must be taken up by the public, or there is little chance of redress; for the spirit of jobbery seems to pervade all bodies constituted by Acts of Parliament, and the influence of wealth finds more sympathy even in the Legislature than the true interests or wants of the people. Q.

Books.

A System of Apparatus for the Use of Lecturers and Experimenters in Mechanical Philosophy. By the Rev. Robert Willis, M.A. London: John Weale. 1851.

When the Rev. W. Farish was elected Jacksonian Professor of Experimental Philosophy in the University of Cambridge, he devised a system of mechanical apparatus, consisting of the separate parts of which machines are made, so adapted to each other that they might be put together at pleasure in the form of any machine required. When Professor Willis succeeded Mr. Farish in 1837, the apparatus had become useless as a representation of British machinery, and he was compelled to reject it; but seeing the advantages of the idea, Mr. Willis availed himself of the modern facilities for machine-making, and carried it out in a more complete manner. The book named at the head of this notice is a description of the system, written and illustrated in such a way that all the parts may be constructed by lecturers themselves or their ordinary workmen. Professor Willis has a peculiar aptitude for the construction of apparatus and models, as all will admit who recollect the models which served for the illustration of his lectures on ecclesiastical architecture at the Royal Institution, Albemarle-street, in 1847. It is stated in the book, to which we are referring, that the system of isometrical perspective now so commonly employed, was first developed by Professor Farish. The system had been previously used, but, Mr. Willis thinks, never explained.

An Inquiry into the Operations of Running Streams and Tidal Waters, with a View to determine their Principles of Action; and an Application of those Principles to Improvement of the River Tyne. By Thomas John Taylor. London: Longman, Brown, and Co.: Newcastle, Lambert. 1851.

The improvement of the Tyne is a subject much agitated in the locality, and has led to statements of very contradictory character. Mr. Taylor's ultimate object in the book before us is a proper settlement of that special question, but for this purpose he seeks to elicit fixed rules or principles, and has thus rendered the volume useful to others than those interested in the Tyne.

He enforces—what has been lost sight of by some writers—that it is the flood state of rivers which is their really governing state, and shows how a few large floods in a twelvemonth may constitute themselves the lawgivers, as it were, of a river.

"There is not in nature," he says, "any such thing as a feeble stream. It will be recollected, that *an inch of rain is equal to a fall of almost exactly* 100 *tons of water on every acre;* wherefore brooks, regarded as insignificant, and which collect the water of only a few square miles of basin, may yet, during heavy rains, discharge very considerable volumes of water, and are then possessed of corresponding, and, indeed, surprising power. I have at this moment in view a brook which, in droughty weather, does not carry more than 500 gallons per minute: it has an average fall of 30 feet to the mile, and a run of 6 miles. In a flood state I have known this stream convey 22,500 gallons per minute, and it has higher floods than the one I happened to measure. However, let us calculate its power at the rate of discharge mentioned, which was ascertained more towards the head than the outfall of the stream, so that the rate of discharge may be considered as below the average for the whole length of course.

The total fall is 180 feet: the quantity is 22,500 gallons, equal to 225,000lbs. per minute: the co-efficient for a horse-power is 33,000lbs. Whence

$$\frac{180 \times 225,000}{33,000} = 1,227 \text{ horses' power.}$$

The whole of this large force is absorbed by the resistance of the bed, excepting only that small remainder which gives motion to the current; but it is not the less on this account a living and actual power in operation, doing its full work as an aggregate. We may conceive the entire force as distributed over the bed, every 100 yards of course absorbing nearly 12-horse power, and every 8¼ yards employing 1-horse power; and thus Nature breaks her large forces into smaller ones, which do her bidding gently.

We may take an example of this kind from the Tyne itself. It is not unusual for this river, during a land flood, to discharge 36 millions of tons of water in 24 hours, being equivalent to a *net* quantity of half an inch of rain over the entire extent of its basin. The highest sources are about 1,200 feet above the sea level; but the mean elevation of the basin may be taken at 500 feet. Now 36 million tons in 24 hours are 25,000 tons per minute; and a horse-power being 33,000lbs., equal to 14·7 tons, we have

$$\frac{25,000 \times 500}{14\cdot7} = 850,340 \text{ horses' power.}$$

A flood which rose, at its highest elevation, a few inches above the floor of the house at Ryton island, discharged, according to my calculation, upwards of 70 millions of tons of water in 24 hours (70,383,909), to which may be added the waters at the same time extending over the Haughs, estimated at 9,874,286,—in all 80,258,195 tons, or say 80 millions of tons in 24 hours."

* * * * * *

"The gross power of the fall of Niagara is, according to Blackwell's observations, equal to that of nearly seven millions of horses: others, from different data, make it as high as ten or twelve millions, and even more. In fact, taking into account the constancy of its operation, the effort of this great cataract will bear a comparison with that of the entire adult labouring population on the face of the globe."

Such of our readers as are interested in the operations affected by running waters, and in the conservancy of rivers, may consult with advantage Mr. Taylor's book.

The Book of Almanacs, with an Index of reference, by which the Almanac may be found for every Year, whether in an Old Style or New, from any Epoch, Ancient or Modern, up to A.D. 2000. Compiled by Augustus de Morgan, Sec. R.A.S., &c. London: Taylor, Walton, and Maberly. 1851.

Ferguson, the mathematician, in "Select Mechanical Exercises," gave tables for expeditiously calculating the time of any new or full moon within the limits of 6,000 years, and Francœur, in "*Theorie de Calendrier*," imagined the plan of uniting the thirty-five almanacs, and indicating the proper one for each year by an index. From these hints Professor de Morgan has constructed his Book of Almanacs, intended, in matters purely chronological, "to supply the place of the old almanac, which is never at hand when wanted,—of the older almanac, which never was at hand,—of the future almanac, which is not yet at hand,—and of the *Universal Almanac* in every shape."

Briefly, the work is intended to enable any one, without calculation, to place before himself the almanac of any year of old style, or of any year of new style, from A.D. 1582 to A.D. 2000; to enable the reader to decide on the *moon-light* of any month; and to give short means of calculating always within two hours the times of new and full moon for any